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Dr. Middleton PHYS 132 HW
4-24-17   ch. 22

P: 30, 32, 49

Problems

22.P.30) $L = 2.5m$
$\lambda = 600nm$

a.) This is a double Slit aperture. The maxima and minima are of Equal distance.

b.) $\Delta y = \dfrac{\lambda L}{d}$ $\Delta y = 1cm$
$\lambda = 600nm$
$L = 2.5m$

$d = \dfrac{\lambda L}{\Delta y} = \dfrac{(600 \times 10^{-9}m)(2.5m)}{(1.0 \times 10^{-2}m)} = 1.5 \times 10^{-4}m = 0.15mm$

a.) Double Slit
b.) $d = 0.15mm$

$\lambda = 633\,nm$
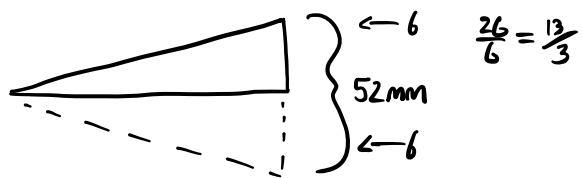$L = 3.0\,m$
$\Delta y = 4.3 \times 10^{-3}\,m$

$\Delta Y = \dfrac{\lambda L}{d}$

$d = \dfrac{\lambda L}{\Delta Y} = \dfrac{(633 \times 10^{-9}\,m)(3.0\,m)}{(4.3 \times 10^{-3}\,m)} = 4.39 \times 10^{-4}\,m$

$$d = 0.44\,mm$$

$\leftarrow 6$

$52\,mm$

$\leftarrow 6$

$\dfrac{26}{6} = \dfrac{13}{3}$

22.P.49

$\lambda = 550\ nm$
$d = 2.0\ \mu m$
$M = 1$

$d\sin\theta_m = m\lambda$

$\theta = \sin^{-1}\left(\frac{m\lambda}{d}\right) = \sin^{-1}\left(\frac{550\times10^{-9}m}{2.0\times10^{-6}m}\right)$

$\theta = 16°$
$\theta_R = 0.28\ R$

$\theta = 16°$
$\theta_R = 0.28\ Rads$